

ORDINANCE NO. \_\_\_\_\_

AN ORDINANCE AMENDING TITLE 10, B.R.C. 1981, BY  
ADDING CHAPTER 10-7.5, “GREEN BUILDING AND POINTS  
PROGRAM”; REPEALING SUBSECTION 10-5.5.2(y) AND  
SETTING FORTH RELATED DETAILS

BE IT ORDAINED BY THE CITY COUNCIL OF THE CITY OF BOULDER,  
COLORADO:

Section 1. Title 10, B.R.C. 1981, is amended by repealing Subsection 10-5.5-2(y),  
‘Resource Conservation–Green Points and replacing it with the addition of a new Chapter 10-7.5,  
‘Green Building and Green Points Program’ to read:

TITLE 10 STRUCTURES  
Green Building and Green Points Program

**10-7.5-1 Legislative Intent and Purpose**

The purpose of this chapter is to protect the public health safety and welfare by regulating residential construction with the intent to conserve energy, water and other natural resources, preserve the health of our environment through optional and mandatory requirements related to design, construction, operations, recycling, and deconstruction This chapter has the following additional purposes:

- (a) It provides criteria for rating the environmental performance of residential construction practices and provides guidelines for documentation that demonstrates conformance with the criteria;
- (b) It encourages cost-effective and sustainable residential building methods, by encouraging conservation of fossil fuels, water and other natural resources, reduction of greenhouse gas emissions, recycling of construction materials, reducing solid waste and improving indoor air quality;
- (c) It identifies the specific requirements for complying with the Green Points Program and how the program interfaces and exceeds the 2006 International Energy Conservation Code adopted in Chapter 10-7, ‘Energy Conservation and Insulation Code,’ B.R.C. 1981; and
- (d) It includes mandatory green building requirements to ensure that construction waste and deconstruction materials are recycled, reused, or otherwise diverted from land fills, and minimum requirements to ensure that dwellings are constructed in an efficient manner.

### **10-7.5-2 Scope and Administration**

- (a) Scope. The provisions of this chapter apply to the following:
- (1) New construction, remodels, or additions to a dwelling, including without limitation single-unit dwellings, multi-unit dwellings, and dwellings within mixed use developments.
  - (2) Any two or more building permits for the same structure that are applied for in any 12 month period shall be considered as one application for the purpose of calculating green points.
  - (3) The requirements of this chapter shall apply to construction activities of all types of dwellings unless the context clearly indicates otherwise.
  - (4) The requirements of this chapter are in addition to and do not replace the requirements within the Boulder Revised Code, including without limitation all of the life safety codes, the historic preservation ordinance, the land use code and the City of Boulder Design and Construction Standards.
- (b) Administration. The Green Points Program shall be administered in accordance with Chapter 1, "Administration," of the International Building Code (IBC) as adopted with amendments by Section 10-5-2, "Adoption of International Building Code with Modifications," B.R.C. 1981.
- (c) Inspection and Compliance. No person shall fail to comply with the requirements of this chapter. No person shall construct in violation of a Green Points approval. All approvals and inspections of Green Point's applications and requirements shall be done in conjunction with a residential building permit application and field inspections. An application shall be made on a form that is approved by the city manager.
- (d) Exceptions. Any development that includes dwellings that are pursuing a U.S. Green Building Council's LEED™ (Leadership in Energy and Environmental Design) Silver Certification or higher will be exempt from the Green Points requirements. No person that applies for this exception shall fail to complete the LEED™ certification process and receive such certification within six months after the final inspection on the building permit. The city manager may grant an extension to this time period if a request is made by the applicant and the applicant demonstrates a good cause as to why additional time is needed to complete the certification.

### **10-7.5-3 Mandatory Green Building Requirements**

- (a) Energy Efficiency. An applicant for a building permit for each new dwelling shall demonstrate that the building is more energy efficient than a building that meets the minimum requirements of Chapter 10-7, "Energy Conservation and Insulation Code," B.R.C. 1981. Table 1 lists the minimum energy efficiency requirements.

TABLE 1–Tiers for Energy Efficiency and Footprint Threshold Recommendations

Type of Project	Square Footage	Energy Efficiency Thresholds Above Code
New Construction	Up to 1,500	15 percent more energy efficient than 2006 IECC
	1,501-3,000	30 percent more energy efficient than 2006 IECC
	3,001-5,000	50 percent more energy efficient than 2006 IECC
	5,001 and up	75 percent more energy efficient than 2006 IECC

- (b) Energy Efficiency–HERS Index Rating. A new dwelling shall be evaluated using the Home Energy Rating System (HERS). The HERS rating will be used for the verification of energy performance of new construction. A HERS rating shall be performed by a rater certified by the Residential Energy Services Network (RESNET).
- (c) Energy Audit. An applicant for a building permit for an addition to a dwelling or a remodel of a dwelling shall be required to obtain an energy audit or a HERS rating report. The applicant shall provide proof of the completion of the energy audit with a building permit application. The energy audit of the house shall quantify the annual energy performance of the building according to generally accepted standards for energy audits approved by the city manager. An energy audit or an optional HERS rating report will indicate how efficiently the building is operating and where inefficiencies are occurring.
- (d) Compact Fluorescent Light Bulbs. Prior to final inspection for an addition to a dwelling or a remodel of a dwelling the applicant for shall install Compact Fluorescent Light Bulbs (CFLs) in at least 50 percent of the existing home's light fixtures that will accept CFLs.
- (e) Direct Vent Furnace. When the scope of the work of an addition to a dwelling or a remodel of a dwelling requires replacement of a furnace, the furnace shall be replaced with a direct vent unit that has a minimum 90 percent AFUE.
- (f) Construction Waste Recycling. An applicant for a building permit for a new dwelling or an addition to a dwelling shall demonstrate that a minimum of 50 percent of construction waste is recycled. Waste diversion calculations and tracking spreadsheet form must be provided at project completion which shows that the minimum recycling requirements have been met. No person shall fail to complete the diversion calculations and tracking spreadsheet or recycle construction waste as required by this section.
- (g) Demolition Management. An applicant for a demolition permit for demolition of all or part of a dwelling (remodels or demolitions classified as "entire structures" on a demolition permit) shall demonstrate through a deconstruction plan that at least 65 percent of material by weight from deconstruction of the existing structure, including concrete and asphalt, will be diverted from the landfill. No person shall fail to follow or otherwise implement an approved deconstruction plan.

#### 10-7.5-4 Resource Conservation – Green Points

- (a) Schedule for Green Points. Residential building permit applicants are required to earn green points according to the schedule in Table 2.

TABLE 2

<b>Project Description</b>	<b>Square Footage Thresholds</b>	<b>Green Point Requirements<sup>1 2</sup></b>
<b>New construction of single unit dwellings</b>	1,501-3,000	20
	3,001-5,000	40
	5,001 and up	60
<b>Additions to a dwelling</b>	1,001- 2,000	15
	2,001–3,000	30
	3,001 and up	45
<b>Interior remodels of a dwelling</b>	1,001–2,000	10
	2,001–3,000	20
	3,001 and up	30
<b>Multi-unit Dwellings:<sup>3</sup> final tenant finish of a unit in a multi unit dwelling</b>	1,001–2,000	10
	2,001–3,000	20
	3,001 and up	30

(b) Site Development

## (1) Landscaping

(A) Organic Soil Amendments: 2 points

(B) Xeriscape Landscaping: 1-4 points

(i) Reduce turf areas to a minimum: 1 point

(ii) All planting beds mulched with wood chips at least 3' deep: 1 point

---

<sup>1</sup> One green point is awarded for each HERS rating score below the HERS index rating requirement.

<sup>2</sup> The green point values listed in Subsections 10-7.5-4(e) and (f) only apply to those projects that are not required to have a HERS index rating.

<sup>3</sup> Each dwelling in a multi-unit dwelling shall be required to meet the green point requirements separately.

- (iii) Appropriate use of xeric (low-water-demand) plants grouped by water needs: 1 point
- (iv) Zoned Irrigation System: 1 point

(2) Shading of Hardscapes:

- (A) Preserve Existing Mature Trees on Site: Up to 5 Points (1 Point per tree)
- (B) Plant Shade Trees: Up to 5 Points (1 Point per tree)

(3) Surface Water Management - Permeable Sites: 1-4 Points. Points are awarded according to the following:

Percentage of Site that is Permeable	Points
> or equal to 50%	1
> or equal to 75%	2
> or equal to 90%	3
100%	4

(4) High-Efficiency Automatic Irrigation: Up to 2 points. Points are awarded according to the following:

- (A) 75% Efficiency Rating: 1 point
- (B) 95% Efficiency Rating: 2 points

(c) Historic Building Rehabilitation: This subsection applies to individual landmarks and contributing buildings located in historic districts (remodels and additions only): Up to 5 points. Points are awarded according to the following:

- (1) Complete and appropriate rehabilitation and/or retrofitting of historic windows and doors: 3 Points
- (2) Storm System: 2 points. Installation of appropriate interior or exterior storm systems.

(d) Waste Management:

- (1) Reuse Existing Building: Up to 5 points. Incorporate portions of existing structures in remodel and addition projects according to the following:
  - (A) Save 50% of Walls (external skin and framing): 3 points
  - (B) Save 75% of Walls (external skin and framing): 5 points
- (2) Remodels, Additions, and Demolition: Up to 3 points. Green points will be awarded on waste diversion on existing buildings (additions, remodels, or complete demolitions classified as an "entire structure" on a demolition permit)

beyond the mandatory waste diversion requirements. Points will be awarded for additional diversion according to the following:

- (A) 75% deconstruction material diverted from landfills: 2 points
- (B) 85% deconstruction material diverted from landfills: 3 points
- (3) New Construction Waste Recycling: Up to 3 points. Green points will be awarded on waste diversion beyond the mandatory waste diversion requirements. Points will be awarded according to the following:
  - (A) 75% waste material diverted from landfills: 2 points
  - (B) 85% waste material diverted from landfills: 3 points

(e) Energy Efficiency.

- (1) Insulation. Points will be awarded according to the following:
  - (A) Minimum R-19 cavity plus R-5 sheathing wall insulation: 2 points.
  - (B) Minimum R-49 ceiling: 2 points.
  - (C) Exterior minimum R-10 insulation installed for the full height of a basement or foundation wall: 2 Points
  - (D) Insulated Pre-cast Concrete Foundation: 2 points
  - (E) Insulated Concrete Forms: 2 points
- (2) Air Sealing of an Existing Building. Points will be awarded when a HERS rating is applied to the existing structure preconstruction, then a post rating after construction showing:
  - (A) Ten percent net increase in initial HERS rating\*: 2 points
  - (B) No net increase in initial HERS rating\*: 3 points
  - (C) Decrease in initial HERS rating\*: 5 points

\*Because of the variability of existing construction, projecting the final HERS rating can be difficult and planning for contingencies if the planned HERS rating is not achieved should be done.
- (3) Heating, Ventilation and Air Conditioning (HVAC) Systems. Points will be awarded according to the following:
  - (A) HVAC Commissioning: 3 points. Testing for duct leakage, firing rate, and refrigerant charge.
  - (B) Ground Source Heat Pump: Up to 10 points. Points will be awarded according to the following:
    - (i) 30-39% calculations from a heating/ cooling load bin analysis: 4 points
    - (ii) 40-49% calculations from a heating/ cooling load bin analysis: 6 points

- (iii) 50-59% calculations from a heating/ cooling load bin analysis: 8 points
  - (iv) 60-69% calculations from a heating/ cooling load bin analysis: 10 points
- (C) Direct Vent Combination Space/Water Heating System: 2 points
- (D) ENERGY STAR Boiler: 2 points
- (E) Zoned, Hydronic Radiant Heating: 2 points
- (F) Passive Cooling: 2-5 points (one point per item). Points will be awarded for passive cooling systems using any two or more of the techniques described below:
  - (1) Exterior vertical shading devices for east and west facing glass.
  - (2) Reflective films or glass on east and west facing windows.
  - (3) Radiant, heat-reflective barriers installed in the attic space.
  - (4) Landscaping that shades east and west-facing glazing during the cooling season (June to September).
  - (5) South window overhang sized to effectively shade the window from June to September.
- (G) Whole House Fan: 2 points
- (H) Evaporative Cooling: 3 points
- (4) Water Heater.
  - (A) Tank-less Water Heater: 2 points
  - (B) Point-of-Use Water Heater: 2 points
- (5) Lighting, Appliances, and Electricity.
  - (A) ENERGY STAR Advanced Lighting Package (ALP): 5 Points. The ALP shall meet the following minimum specifications.

High-Use Rooms	Kitchen, Dining Room, Living Room, Family Room Bathroom(s), Hall(s)/Stairway(s)	50% of Total Number of Fixtures
Medium/Low-Use Rooms	Bedroom, Den, Office, Basement, Laundry Room, Garage, Closet(s) and all other rooms	25% of Total Number of Fixtures
Outdoor	Outdoor Lighting Affixed to the structure or Free-Standing Pole(s) Except for landscape and solar lighting	50% of Total Number of Fixtures including all flood lighting

- (B) Efficient Light Controls: Up to 2 points. Efficient lighting controls include occupancy sensors, dimming controls, and automatic daylight dimming controls.
  - (1) 4 control devices: 1 point
  - (2) 6 control devices: 2 points
- (C) Energy-Efficient Appliances: Up to 6 Points. Points are awarded according to the following:
  - (1) ENERGY STAR rated refrigerator: 2 points
  - (2) ENERGY STAR rated clothes washer: 2 points
  - (3) ENERGY STAR rated freezer: 1 point
  - (4) ENERGY STAR rated dishwasher: 1 point

(f) Solar

- (1) Passive Solar Heating Design: 6-12 points. Design with passive solar heating elements of south facing glazing, appropriate thermal mass and building overhangs.
    - (A) 40-49% verifying calculations of the solar heat gain fraction: 6 points
    - (B) 50-59% verifying calculations of the solar heat gain fraction: 8 points
    - (C) 60-69% verifying calculations of the solar heat gain fraction: 10 points
    - (D) >70% verifying calculations of the solar heat gain fraction: 12 points
  - (2) Solar Thermal Domestic Hot Water System: 8 points. Systems must be sized to provide at least 50% of the domestic hot water load.
  - (3) Solar Thermal Space Heating or Pool/Spa System: 3 points. Systems must be designed to offset a minimum of 15% of the annual space heating or pool or spa load.
  - (4) Pre-Plumb for Solar Thermal System Retrofit: 2 points.
  - (5) Active Solar Electric System: 6-12 points. Design and install an active solar (photovoltaic) system to meet the electrical load of the building according to the following schedule:
    - (A) 30-39% solar electricity or equivalent to 2 KW system: 6 Points
    - (B) 40-49% solar electricity or equivalent to a 3 KW system: 8 Points
    - (C) 50-59% solar electricity or equivalent to a 4 KW system: 10 Points
    - (D) >60% solar electricity or equivalent larger than 5 KW system: 12 Points
  - (6) Pre-Wire for Future Solar Electric Installation Retrofit: 2 points.
- (g) Water Efficiency. High Efficiency Fixtures: 2-6 Points. Points will be awarded for installation of high efficiency (low flow) fixtures follows:

- (1) 25% of all fixtures: 2 points
- (2) 50% of all fixtures: 4 points
- (3) 75% of all fixtures: 6 points

(h) Material Efficient Framing and Structure.

- (1) Advanced Framing Techniques: Up to 10 points. Points will be awarded as follows:
  - (A) 24' On-Center Framing: 2 points
  - (B) Insulated Headers: 2 points
  - (C) Energy Efficient Roof Trusses: 2 points
  - (D) HVAC Ducts Within Conditioned Spaces: 2 points
  - (E) Minimum 12-inch Roof Overhangs: 2 points
- (2) Structural Insulated Panels (SIPs): Up to 8 points. Points will be awarded as follows:
  - (A) At least 50% of exterior walls: 5 points
  - (B) At least 50% of exterior walls and roof: 8 points
- (3) Structural Alternatives to Wood: Up to 8 points. Points will be awarded as follows:
  - (A) At least 50% of exterior walls: 5 points
  - (B) At least 50% of exterior walls and roof: 8 points

(i) Sustainable Products.

- (1) FSC-Certified Tropical Woods or No Tropical Wood: Up to 6 Points. Points will be awarded as follows:
  - (A) 2 BF of FSC lumber per SQ/FT of floor area (2 BF/SQ. FT.): 2 points
  - (B) 3 BF of FSC lumber per SQ/FT of floor area (3 BF/SQ. FT.): 4 points
  - (C) 50% or more of dimensional lumber in total BF is FSC, excluding engineered wood products: 6 points
- (2) Environmentally Preferred Materials: Up to 10 Points. Points will be awarded environmentally preferred materials as follows:
  - (A) Recycled content: 2 points
  - (B) Reclaimed: 2 points
  - (C) Bio-based: 2 points
  - (D) Agricultural residue: 2 points
  - (E) Low or no Volatile Organic Compounds (VOCs) emissions: 2 points
- (3) Locally Sourced Materials: Products that are environmentally preferable and/or extracted, processed, and manufactured within 500 miles of the city are

considered local. A maximum of 1.5 points can be earned for any single component listed in the Environmentally Preferable Products Chart regardless of the amount by which a minimum performance threshold is exceeded. A 'recycled content' product must contain a minimum of 25% post-consumer recycled content except as noted otherwise above. Post industrial (pre-consumer) recycled content is counted at half the rate of post-consumer content. Points will be awarded as shown on the Environmentally Preferable Products Chart below:

Environmentally Preferable Products Chart.

Assembly	Component	Product Specification Types (see Note 1)		
		Specifications	Emission Specifications	Local
Exterior Wall	Framing	FSC-certified		X
Exterior Wall	Framing	Finger-jointed studs (vertical use only for structural components)		X
Exterior Wall	Siding or masonry	Recycled content or FSC-certified		X
Floor	Flooring	Linoleum, cork, bamboo, FSC-certified or reclaimed wood, sealed concrete, recycled-content flooring, or combination in 45% of home's floor area.	Carpet & pad: comply with Carpet and Rug Institute's Green Label Plus Program	X
Floor	flooring	BONUS 1/2 for 90% of home	BONUS 1/2 for NO carpet in home	
Floor	Framing	FSC-certified		X
Foundation	Aggregate			X

Foundation	Cement	Fly ash or slag as replacement for, not addition to, cement content (min. 30%)		X
Interior Wall	Framing	FSC-certified		X
Interior Wall	Framing	Finger-Jointed, (vertical use only for structural components)		X
Interior Walls AND ceilings	Gypsum board	Recycled content		X
Interior Walls AND millwork	Paint		Comply with Green Seal Standard GS-11, Paints, First Edition, May 20, 1993	
Interior Walls AND millwork	Wood finishes		VOC concentrations of 150 gpl or less	
Landscape	Decking or patio material	Recycled content or FSC-certified		X
Other	Cabinets	Recovered, recycled content, or FSC-certified	Wood and/or agrifiber products with no added urea-formaldehyde resins	X
Other	Counters	Recycled content	Wood and/or agrifiber products with no added urea-formaldehyde resins	
Other	Doors (not incl. garage)	Recycled content or FSC-certified	Wood and/or agrifiber products with no added urea-formaldehyde resins	X

Other	Trim	Recovered, recycled content, or FSC-certified	Wood and/or agrifiber products with no added urea-formaldehyde resins	
Other	Adhesives and sealants		VOC concentrations of 70 gpl or less	
Other	Windows	Recycled content or FSC-certified		X
Roof	Framing	FSC-certified		X
Roof	Roofing	Recycled content or vegetated (min. 200 sf)		X
Roof AND floor AND wall	Insulation	Recycled content (min 20%)	Comply with State of California, DHS, 'Practice for Testing of VOCs from Building Materials using Small Chambers'	X
Roof, floor, wall (2 of 3)	Sheathing	Recycled content or FSC-certified		X

(j) Indoor Air Quality.

- (1) ENERGY STAR's Indoor Air Quality Package Requirements: 5 points
- (2) Mechanical Ventilation: Up to 5 Points. Points will be awarded as follows:
  - (A) Installation of a kitchen exhaust fan: 1 point
  - (B) Bath exhaust fans with timer or humidistat controls: 1 point
  - (C) Ventilation integrated in the HVAC system: 1 point
  - (D) Incorporating Heat Recovery Ventilation: 2 points
- (3) High Efficiency HVAC Filter: 1 point
- (4) Radon Mitigation: Up to 2 Points. Points will be awarded as follows:
  - (A) Passive System: 1 point
  - (B) Active System: 2 points
- (5) Attached Garage Exhaust Fan: 1 point

(k) Homeowner Information. Operations and Maintenance Binder: 1 Point. The builder shall provide a binder to be left in the dwelling for future occupants that includes the four of the following items:

- (1) The Green Points checklist
  - (2) Home Energy Audit or HERS certificate
  - (3) The equipment manufacturer's installation manuals, except for manuals required to be affixed to the equipment
  - (4) Copies of operations and maintenance instructions for equipment installed in the home
- (l) Windows: Up to 10 points. New windows or replacement windows installed as part of a remodel or an addition. Points will be awarded as follows:
- (1) National Fenestration Rating Council (NFRC): Up to 5 points. Rated Window with Maximum U Value of 0.35 or lower: 1/2 point for each window, up to 5 points.
  - (2) NFRC Rated Window with Maximum Solar Heat Gain Coefficient (SHGC) of 0.55: 1/2 point for each window, up to 5 points. Exception: South facing glass.
- (m) Design Process and Innovation.
- (1) Green Building Consultants: 2 points.
  - (2) ENERGY STAR Builder: 1 point
  - (3) Innovation Points: Up to 10 Points. Points are awarded for products, designs or technologies which minimize the environmental impact of the house in a tangible and demonstrable way beyond the methods outlined in the Green Points Program.

#### **10-7.5-5 Alteration or Modification**

The city manager may make reasonable alterations or modifications in the award of green points or the requirements of this chapter if the manager finds that the strict application of the green points and mandatory green standards creates practical difficulties in the construction of a residential unit or causes undue waste and when the purposes of this chapter are otherwise met through such alteration or modification.

#### **10-7.5-6 Regulations**

The city manager may make reasonable interpretive and administrative regulations to aid in applying this subsection under the procedures of chapter 1-4, 'Rulemaking,' B.R.C. 1981.

#### **10-7.5-7 Definitions**

- (a) The following terms used in this chapter have the following meaning unless the context clearly indicates otherwise:

'FSC' means the Forest Stewardship Council.

'Home Energy Rating System Index' or 'HERS Index' means a rating system where an index of 100 represents the energy use of the "American Standard Building" and an index of zero indicates that the Proposed Building uses no net purchased energy (a Zero Energy Building).

‘Remodel’ means an interior reconfiguration or upgrade of an existing structure of over 500 sq.ft. of the floor area and the work required to complete the reconfiguration or upgrade requires a building permit.

‘Residential Energy Services Network’ or ‘RESNET’ means an organization that sets the standards of quality, and increases the opportunity for ownership of high performance buildings and ensures the success of the building energy performance certification industry.

- (b) Words defined in section 1-2-1, ‘Definitions,’ and section 10-1-1, ‘Definitions,’ B.R.C. 1981, have the meanings there expressed if not differently defined by this chapter.

Section 2. This ordinance shall be effective at 12:01 a.m. on January 2, 2008. It shall be applied to building permit applications submitted after the effective date. Building permits applied for before the effective date shall be considered under the green points program in effect at the time of application.

Section 3. This ordinance is necessary to protect the public health, safety, and welfare of the residents of the city, and covers matters of local concern.

Section 4. The city council deems it appropriate that this ordinance be published by title only and orders that copies of this ordinance be made available in the office of the city clerk for public inspection and acquisition.

INTRODUCED, READ ON FIRST READING, AND ORDERED PUBLISHED  
BY TITLE ONLY this 16th day of October, 2007.

---

Mayor

Attest:

---

City Clerk on behalf of the  
Director of Finance and Record

READ ON SECOND READING, PASSED, ADOPTED, AND ORDERED

PUBLISHED BY TITLE ONLY this 30th day of October, 2007.

---

Mayor

Attest:

---

City Clerk on behalf of the  
Director of Finance and Record